

Nomination of

Lake Canobolas Pumping Station (The Pumphouse) in Orange

for

Engineering Heritage Recognition



**Firas Shawash & William Phippen
Engineering Heritage Sydney
1 December 2021**

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Nomination letter

The Administrator
Engineering Heritage Australia
Engineers Australia
Engineering House
11 National Circuit
BARTON ACT 2600

Name of Cultural Item:

Lake Canobolas Pumping Station – ‘The Pumphouse’, recognising the efforts made to provide Orange with water.

Nature of the Award:

The cultural heritage of the provision of water to Orange is nominated for the award of an Engineering Heritage Marker.

Location:

Lake Canobolas Reserve Orange NSW.

Owner of the site:

Orange City Council. The nomination and a letter of agreement are below.

Access to Sites:

The pumphouse is on the eastern side of Lake Canobolas. A signed road takes visitors off a road below the dam wall, to the left, down to the Pumphouse. Refer to the photos below. The pumphouse has good views of the engines from a platform running along one side of the building. Wheelchair is accessible from one end.

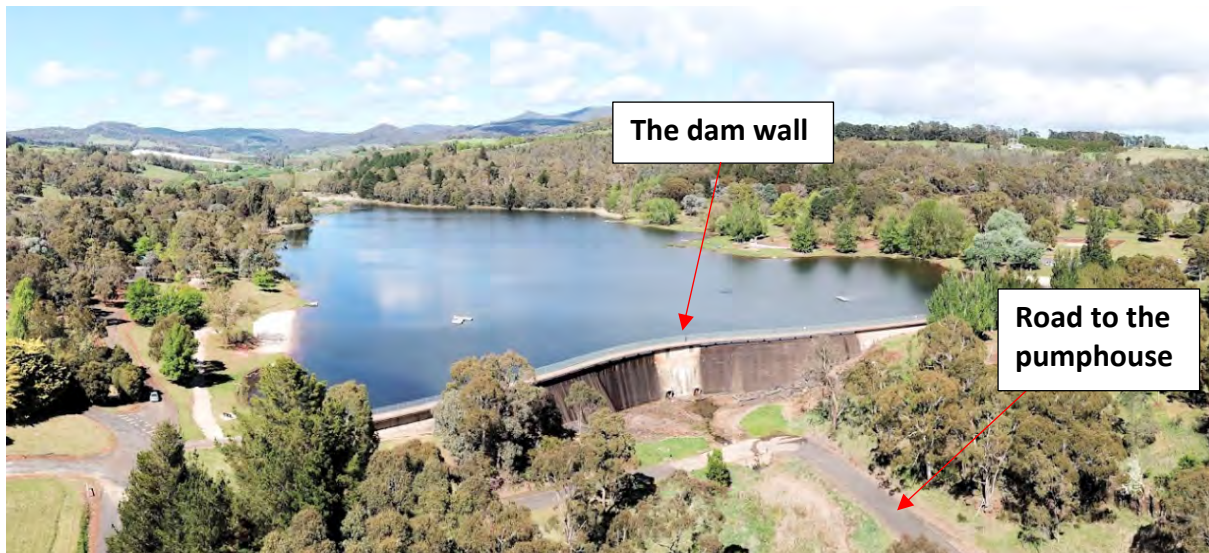
The pumphouse is open daily with free entry.

Nominating Body:

Engineering Heritage Sydney

Frank Johnson

Frank Johnson
Chair, Engineering Heritage Sydney
Engineers Australia, Sydney Division
1 December 2021



Letter of agreement



30 November, 2021

Learned Society Advisor
Engineering Heritage Australia
Engineers Australia
Engineering House
11 National Circuit
BARTON NSW 2600

Dear Sir/Madam,

ENGINEERING HERITAGE RECOGNITION PROGRAM – LAKE CANOBOLAS PUMP HOUSE

Orange City Council is in agreement for the nomination of the *Lake Canobolas Pump House and the pumping equipment* under the Heritage Recognition Program of Engineers Australia. The Pump House is situated on Lake Canobolas Road, Cabonne Local Government Area, Instrument No 1218 on the Cabonne Local Environmental Plan 2012 and is management by Orange City Council.

Lake Canobolas Pump House is historically significant as a rare surviving early twentieth century pumping station purpose built as part of the Meadow Creek Water Scheme between 1915 and 1918. The Pump House includes an intact collection of pumping equipment, the purpose of which was to pump water from Meadow Creek reservoir (Lake Canobolas).

Orange City Council agrees to an interpretation panel and the marker being installed in the proximity of the Pump House, a location is yet to be determined, and to providing assistance with an unveiling ceremony should the nomination be successful.

Should you require any further information, please don't hesitate to contact Alison Russell, Community Museum and Heritage Manager on 63938170 or arussell@orange.nsw.gov.au.

Yours sincerely,

A handwritten signature in black ink, appearing to read "David Waddell", is written over a light blue wavy background graphic.

David Waddell
CHIEF EXECUTIVE OFFICER

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Basic Data

Name of physical items:

The Pumphouse contains three main pieces of equipment: The gas producer which generates Producer Gas using charcoal, coal, or coke. The gas produced then operated the Suction Gas engine that is situated in the centre of the shed. The engine runs the two pumps, each consisting of three pumping pistons, which are located at the western end of the shed.

Other/former names of works: The pumphouse.

Location: Orange NSW.

Address: Lake Canobolas Reserve, Nashdale NSW 2800.

Local Govt. area: Cabonne Shire (Although serving Orange City, the pumps and dam are in the enveloping shire)

Owner: Orange City Council.

Current use: Defunct.

Former use: The pumphouse was used to pump water from Lake Canobolas (previously known as Meadow Creek Reservoir) to provide the town of Orange with water via a pipeline and elevated reservoir.

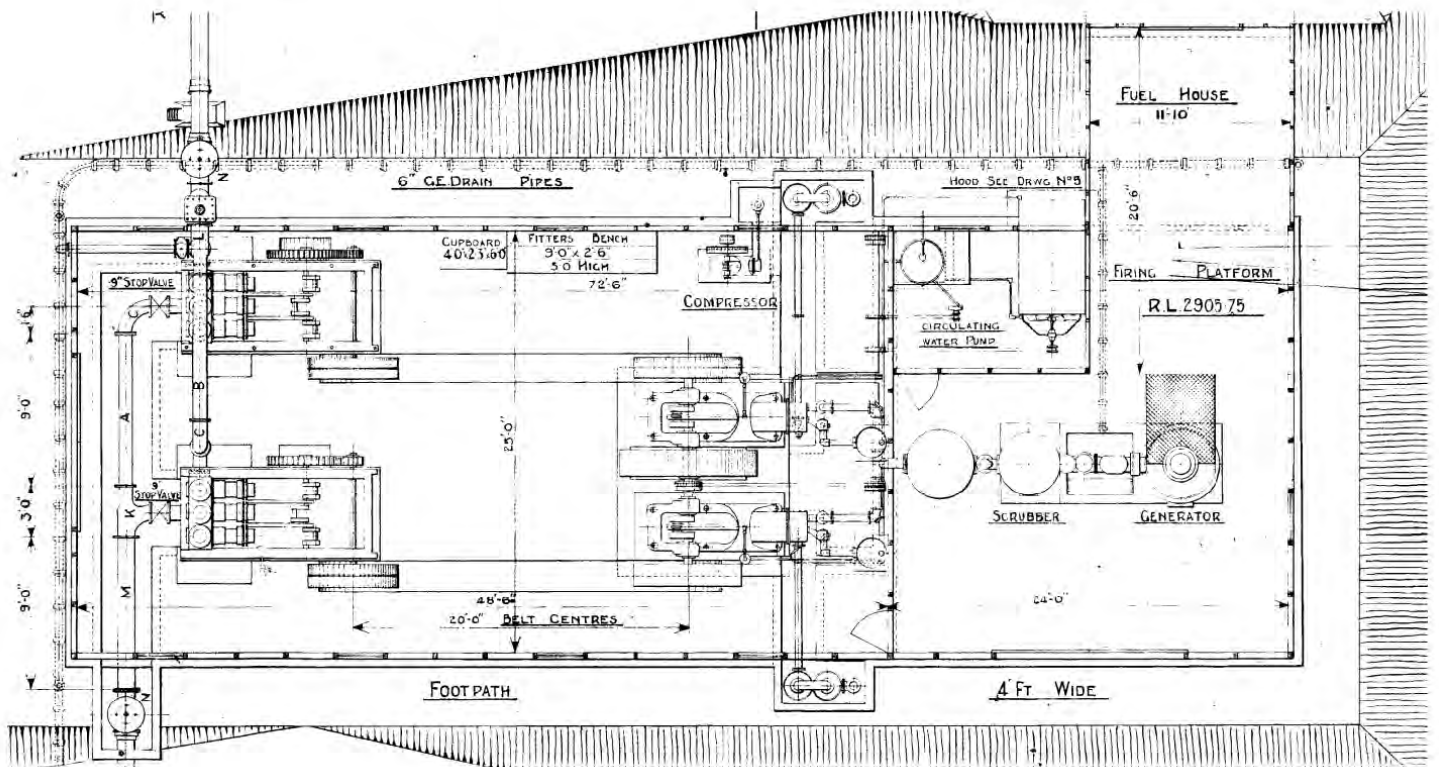
Year started: 1915.

Year completed: 1918.

Ceased operation: Since 1962, the pumphouse has not been used to pump water to Orange.

Physical condition of remnants:

The building and the machine were restored by staff and students of Orange TAFE in 1988. The machines can operate by an electric motor with friction drive on the flywheel, but the pumphouse is not used for pumping water to Orange anymore. The Producer Gas plant is intact but does not operate, though perhaps it could easily be made to do so.



Layout of the equipment in the pumphouse

1. Historical review

European settlement of the Orange area began in the 1820s and the arrival of the railway in 1877 led to the development and the construction of a reticulated water supply with a reservoir on Gosling Creek (400ML) in 1889. Unlike most NSW inland towns, Orange is not situated on a river. The total cost of this scheme, including reticulation, was £32,688 and it was anticipated to cover the needs of the city for the next twenty years. The storage was of such capacity that it could cope without any inflows for two years. The residents were able to have lawns and gardens though by 1911 an additional supply main had to be installed. A sewerage system for the city was contemplated in 1914 and as a result, surveys were carried out to find a suitable location for a second reservoir.

After an inquiry by the Parliamentary Public Works Committee, the decision was made to locate the additional supply on what was then known as Meadow Creek, now known as Molong Creek. Urgent preliminary works were approved and commenced on 4th January 1915. These included the laying of the rising and service mains and the erection of a service reservoir adjacent to the Cargo Road. In December of the same year, the Orange Water Supply Act was passed by the NSW Parliament. This authorised the Minister for Public Works to complete the Meadow Creek water supply scheme, now known as Lake Canobolas, at a cost of £49,160. The works included the storage reservoir (682 megalitres), a building to house the pumps and associated equipment, all of the necessary plant, the rising and service mains, the service reservoir and an extension of the reticulation system into the previously separate town of East Orange. A caretaker's cottage of five rooms was also constructed. This was built near the pumphouse, constructed from brick, concrete and timber with a galvanised iron roof. Lake Canobolas is about 7km from Orange city centre.

The pumphouse was used to pump water for Orange from 1918 to 1932, though with the older gravity scheme being cheaper to operate and with the gas engine perhaps being demanding to operate, it was not used continuously. The town's water supply problems were not solved by the 1918 scheme so a third and much larger scheme (4,680 ML) was built on Spring Creek by 1931. The Lake Canobolas plant was maintained and in 1944 and 1945 and for a period in 1957 was used to supplement supply during droughts. Since 1962 water for the city has been supplied from Suma Park Reservoir on Summer Hill Creek (17,300 ML), Gosling Creek Reservoir and Spring Creek Reservoir, and from that date water from Lake Canobolas was no longer pumped to Orange, the plant abandoned, and the lake became a popular venue for family recreation including fishing, swimming, and other activities.

A timeline of the relevant milestones are shown in the table below:

1846	Orange officially proclaimed a village	1918	Meadow Creek Dam Water Supply Scheme officially opened by His Excellency the Governor General Sir Robert Munro Ferguson (21 March 1918) Meadow Creek Dam water supply brought into commission (682 megalitres) in October 1918 Sewerage system completed
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1860	Orange proclaimed a Municipality	1918	World War I ends
1861	Telegraph connected	1923	Orange electricity works opened
1877	Railway line to Orange opened William Clerk proposes that Orange water supply be provided by a dam on Meadow Creek	1924	Public baths opened
1880	Country Towns Water Supply and Sewerage Act	1928	Council resolves to augment the existing water supply
1887	Blackman's Creek channel works commenced (works continued intermittently until 1939)	1931	Spring Creek dam completed (2,700 megalitres) and augments the supply from Gosling Creek dam Clarification/filtration plant opened on the Gosling/Spring Creek water supply system
1890	Gosling Creek town water supply system opened (400 megalitres)	1940	Land around Meadow Creek dam (Lake Canobolas) starts to be developed as a recreation area
1891	Orange allowed to charge a water levy	1946	Orange proclaimed a city
1910	Orange Sewerage Act	1947	Height of Spring Creek dam raised to increase capacity (4,680 megalitres)
1911	Additional main and balance tank for the Gosling Creek Reservoir completed	1952	Council resolves to construct a new dam at Suma Park
1912	Amalgamation of East Orange and Orange	1955	Lands around Lake Canobolas formerly held by the Minister for Public Works for the purpose of water supply were vested in Orange City Council
1914	World War I starts Work starts on preliminary work for the Meadow Creek water supply system, including a temporary dam wall across Meadow Creek Orange Municipal Council passed a resolution accepting the Meadow Creek Water Supply Scheme as designed by the NSW Department of Public Works	1962	Suma Park Dam completed (17,300 megalitres)
1915	Orange Water Supply Act	1987	TAFE restoration works begin at the Pump

	Laying of sewerage pipes commences		House
1916	Work on the Meadow Creek Water Supply Scheme commences	1988	TAFE restoration works completed

2. Physical Description of the installation

The pumping station consists of three main components:

2.1 Gas producer

The gas producer consists essentially of three parts: The Generator where the gas is actually produced, the Vaporiser provides steam for enriching the gas and the Scrubber cleans and cools the gas prior to it being used in the engine. There is also a Reservoir where the gas is held prior to admission into the engine.

The Generator is first filled with coke and a fire is lit. A hand blower mounted on the side of this unit is used to commence the reaction. Gas is produced by drawing a mixture of air and steam through the incandescent fuel in the generator. Water that is fed into the Vaporiser is heated by the gases leaving the Generator, thus providing the necessary steam.

Before entering the Generator the air for the process is passed through the Vaporiser where it is saturated with the necessary amount of steam. The gas then passes into the Scrubber where it proceeds through a column of coke, kept wet by a suitably arranged sprinkler. This cleans and cools the gas. It then passes into a Reservoir box which is connected directly to the engine by means of pipe work. The suction provided by the engine on its intake stroke provides the necessary vacuum to sustain the reaction.

From then the process is automatic, the engine is kept running providing the Generator is kept fuelled with coke. The process will stop when the engine is shut down. The gas produced by this process is known as Producer Gas and is similar to the gas used by many motor vehicles during the Second World War and is a mixture of carbon monoxide, hydrogen, carbon dioxide and inert nitrogen.

2.2 Gas engine

The second section of the machine is the Hornsby-Stockport Gas Engine. This unit was manufactured by Richard Hornsby and Sons, Limited of Grantham and Stockport, England. It is a two-cylinder suction gas engine rated at 128 horsepower (96 kilowatts) with an operating speed of 230 R.P.M. The works number for the engine is 50137. This engine has the distinction of being the last engine manufactured by Richard Hornsby prior to the First World War and was shipped to Melbourne on 24 February 1918. The Admiralty took over the Hornsby factory for the duration of the war. As a matter of interest, the first engine built by the Company after the war, number 52138, was also shipped to Melbourne for installation at Mildura, Victoria on the 17 August 1920.

The two cylinders use a common flywheel located between the cylinders and this has a diameter of 8 feet 2 inches (2.5m) and 19 inches (480mm) wide. The cylinders are 15 inches (380mm) in diameter driving onto a common crankshaft, on the outer ends of which, are keyed two pulleys each 5 feet 6 inches (1.680 m) in diameter. The water pumps are driven by long leather belts from these.

The engine is started using compressed air supplied by a separate internal combustion engine.

2.3 Water pump

The third component of the plant are the two piston pumps. These were manufactured by R. Warner and Company (Engineers) of Walton on Naze, England. The centre distance between the engine pulleys and those on the pumps is 24 feet (7.3m), the pulleys being 6 feet (1800mm) in diameter. Each pump has three 10 inch (250mm) diameter pistons with a stroke of 12 inches (300mm) and had a total output of 60,000 gallons (270,000 litres) per hour.

Mounted above each pump cylinder were vessels containing air to reduce the effect of water hammer. These were removed at some stage and replaced with a single large cylinder for each pump.

Water from the pumps was fed into a common main, 12 inches (300mm) in diameter, through which the water flowed to a 500,000 gallon (23 kilolitre) service tank, at an elevation of 3036 feet (925 m), located on Cargo Road on the outskirts of Orange. It was then reticulated by 10 inch (250mm) gravity main to homes and businesses in the city.

3. Heritage Assessment

3.1 Historical Significance

The pumping station was built between 1915 and 1918 as part of the Meadow Creek Water Supply Scheme. The purpose of the scheme was to augment the existing water supply for the growing town of Orange. The Lake Canobolas Pumping Station illustrates historical efforts to provide an adequate water supply for Orange which, unlike many other NSW towns, is not located on a river.

3.2 Association with Historic Individuals

Plans of the works are signed by Percy Allan, NSW Public Service Department civil engineer.

3.3 Creative or Technical Achievement

The Pumping Station demonstrates the effectiveness of the Country Towns Water Supply and Sewerage Act 1880 in the provision of water supply infrastructure for country towns in NSW.

3.4 Research Potential

The provision of the pumping station as a part of the earlier schemes has encouraged the provision of further water schemes to the town of Orange, and hence the development of the town.

3.5 Social Significance

The Pumping Station demonstrates the adoption of a relatively new technology and the, then common, preference for British technology.

3.6 Rarity

It was the earliest pumping station to be built in Orange. It is one of very few intact examples of a producer gas powered pumping station in Australia.

The pumphouse features technologies that are no longer used in the industry, such as piston pumps and Producer Gas engines, so it can be considered an example of the development of knowledge.

Producer gas engines were soon superseded by oil based fuels and electricity due to convenience, operating cost and cleanliness.

It is noted that the Regional Museum of Orange has developed a Learning Pack for the house to assist school visits as a guide for teachers.

3.7 Representativeness

The Pumphouse and the equipment can provide further information about the history, technology, operation, and rarity of individual pieces of its equipment collection, which is representative of the technology that was during that time.

3.8 Integrity/Intactness

The pumping equipment is intact and potentially operational. Ancillary items such as tools, operating instructions are also practically complete. The building which houses the pump is original and complete. The pump and the building were restored by students of TAFE Orange in 1987.

4. Statement of Significance

The pumping station is of cultural significance because:

- It is a rare, perhaps unique example of an intact installation of an interim technology between externally-fired steam engines and electrically-driven machines.
- It commemorates the effort and innovative thinking undertaken to supply the town with water using technologies that do not rely on electricity, like the Producer Gas engine and ram pumps. This was an important contributing factor in the development of Orange and its transformation from a village to a city.
- The pump station is not listed as a heritage item in the Orange Local Environmental Plan 2011, nor in any register.
- As little is known by the general public of the history of the pumping station the heritage marker will encourage people to explore their neighborhood and will bring its history and story alive.

5 Interpretation

The pumphouse already has interpretation panels inside.

6 Recommendation

It is recommended that *Lake Canobolas Pumping Station (The Pumphouse)* be awarded an Engineering Heritage Marker.

Images



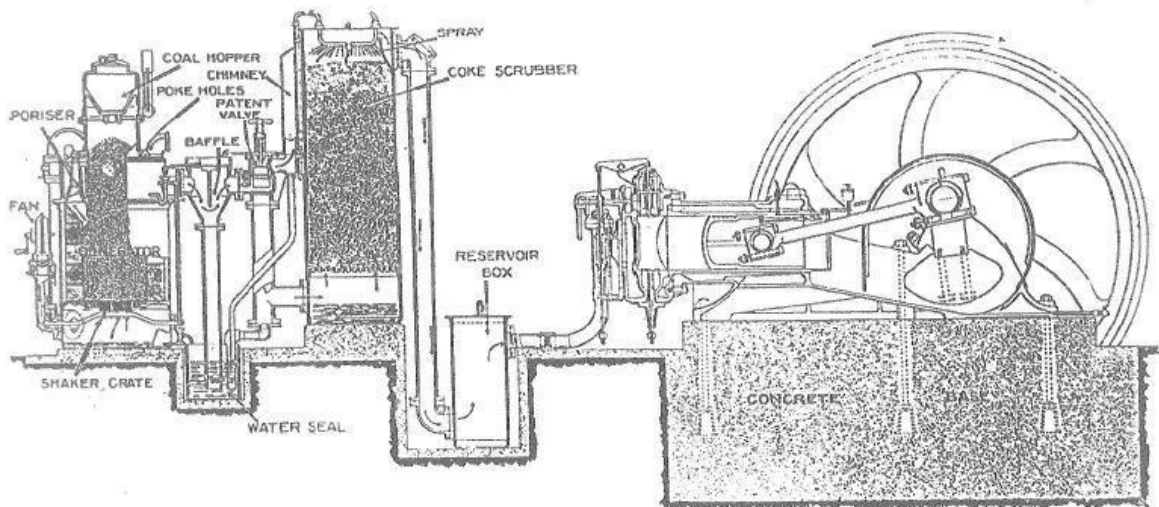
The engine



Water pump



View from right to left is the Gas Generator, the Scrubber, and the Gas Reservoir



View from right to left is the Gas Generator, the Scrubber, and the Gas Reservoir



One of the pump pulleys. The reduction gearing to the pump crankshaft can be seen through the spokes



End view of starting engine showing from left, flywheel, magneto, power cylinder and air compressor.

References

Orange Local Environmental Plan 2011 (2012 EPI 55)-

<https://legislation.nsw.gov.au/view/html/inforce/current/epi-2012-0055> , accessed on 13/11/2021.

Lake Canobolas Pump House Learning Resource, Orange Regional Museum-

<https://www.orange.nsw.gov.au/parks-reserves/lake-canobolas/>, accessed on 13/11/2021.

Lake Canobolas Conservation Management Plan by Kate Higgins and K & H Ainsworth Engineering Pty. Ltd.